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Original Research Article

Phacolytic glaucoma: visual outcome

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ABSTRACT

Background: This study was conducted to evaluate the visual outcome of phacolytic glaucoma, a common cause of ocular morbidity.
Methods: Participants were 30 patients in a tertiary care hospital for both urban and rural population. 30 eyes of patients clinically diagnosed as phacolytic glaucoma were treated. Demographic data and duration of the symptoms of the patients before presenting to the hospital were noted. Intraocular pressure (IOP) and visual acuity were recorded preoperatively and postoperatively. Small Incision cataract surgery with posterior chamber intraocular lens implantation (IOL) was done after the control of intraocular pressure and inflammation. Postoperative complications were noted. The data was analyzed by simple statistical methods.
Results: Age group distribution was 19 (63.3%) in >50-60 yrs, 9 (30.0%) in >60-70 yrs and 2(6.4%) in >70 yrs. Sex distribution was 21 (70.0%) of males and 9 (30.0%) of females. Mean age of the all the patients was 60.7 yrs (males 59.95 yrs and females 62.6 yrs). Laterality was RE in 16 (70.9%) and LE in 9 (30.0%). Duration of the presenting symptoms before reporting to the hospital was <1 week in 17 (56.6% and >1 week in 13 (43.3%). Mean IOP was 45.8 mmHg preoperatively. Visual Acuity was PL doubtful in 2 (6.6%), PL +ve in 15 (50.0%) and HM<3/60 in 13 (43.4%) preoperatively. Postoperative visual acuity at 6-8 weeks was <6/60 in 8 (26.7%) and >6/60 in 22 (73.3%). Postoperative complications were bullous keratopathy in 5 (16.6%), anterior uveitis with membrane on IOL in 7 (23.3%), posterior capsular tear in 3 (10.0%) and Zonular dialysis in 2 (6.6%). Fellow eye showed pseudophakia in 22 (73.4%), immature cataract in 6 (20.0%) and Aphakia in 2 (6.6%).
Conclusions: This study concludes that a better Visual outcome in phacolytic glaucoma depends on the effective Preoperative control of intraocular pressure and inflammation.

Keywords: Extracapsular cataract extraction, IOP, Phacolytic glaucoma, Visual outcome

INTRODUCTION

Lens induced glaucoma (LIG) commonly occurs in India, with a cataract backlog of about 12 million and an annual estimated rate of 3.8 million cases due to the incidence of cataract cases far exceeding the total number of surgeries done currently.[1-4] LIG, which affects the function of the optic nerve due to the rise of IOP is a secondary glaucoma either angle closure (phacomorphic) or open angle (phacolytic).

Giffords et al in 1900 first described the clinical picture of phacolytic glaucoma.[5] Flocks et al in 1955 showed its association with a leaking hypermature cataractous lens and named it as 'phacolytic glaucoma'.[6] Irvine et al and Goldberg et al demonstrated the rise of IOP due to the

aqueous outflow channels block by macrophages laden with lens proteins and the cortical fluid escaped from the ruptured lens capsule.[7-9] Goldberg et al described the Millipore filtration procedure to identify the causative macrophages.[9] Epstein et al experimental study demonstrated not only the leak of soluble high molecular weight lens proteins leading to trabecular meshwork block but also this trabecular meshwork obstruction not relieved by prolonged anterior chamber irrigation or perfusion with mock aqueous humour in the enucleated eye.[10,11] Zeeman et al described the macrophagic response to the leaking lens material as the cause of raised IOP, which was later supported by and Scheie Y et al.[12,13]

Historically, intracapsular lens extraction (ICE) was the established surgical technique for phacolytic glaucoma.[14-18] Epstein DL et al described that a simple lens extraction theoretically, clears the trabecular meshwork of the proteins and macrophages, with a very stormy postoperative period with its attendant sequelae and extracapsular cataract extraction (ECCE) may aggravate the inflammation due to residual lens matter.[14,15] Zeeman et al thought that ECCE may be harmful with a weak capsular and zonular system and a fragile posterior lens capsule with microscopic defects, leading to a severe postoperative anaphylactic uveitis.[12] Irvine et al in 1957 was the first to advise ECCE, after the introduction of microsurgical ECCE with posterior chamber intraocular lens (PC IOL) implant, which prevents the forward movement of the vitreous and hence vitreous loss.[7,8] Gross et al and Lane et al reported excellent results with ECCE and did not find any weak capsule and zonules.[19,20] This study was mainly done to evaluate the IOP, the visual outcome and the complications of Phacolytic glaucoma.

METHODS

This study was conducted in 30 eyes of the patients with a clinical diagnosis of phacolytic glaucoma, attending Glaucoma department of our institution over a period of one year (January 2015 to March 2016). Phacolytic glaucoma with a history of trauma, acute angle closure glaucoma, phacomorphic glaucoma, phacoanaphylactic glaucoma, inflammatory glaucoma and neovascular glaucoma were excluded. Clinical examination of both eyes of the patients preoperatively and postoperatively, included Snellen's visual acuity, slitlamp biomicroscopy, Goldmann's applanation tonometry, gonioscopy when possible, fundus examination with an indirect ophthalmoscope and +90 D Lens, and B scan ultrasonography.

The clinical presentation establishing the diagnosis of phacolytic glaucoma was a history of sudden onset of pain, redness, watering in a congested eye with corneal edema, marked anterior chamber inflammation with minimal keratic precipitates, presence of cholesterol crystals in the anterior chamber, hypermature cataract with white deposits on the anterior capsule and a raised IOP. After obtaining the informed consent with explanation of relatively guarded prognosis, the management before surgery for 48 hours included systemic acetazolamide 250mg three times a day and 0.5% timolol eye drops twice daily, dexamethasone 0.1% eye drops 6 times a day and 2% Homatropine eye drops. Raised IOP was treated with I.V. 20% mannitol whenever required. The objective was to operate on a quiet eye after the control of IOP and inflammation. Then all the patients were operated under peribulbar anaesthesia by a single surgeon. The period between diagnosis and surgery varied between 5 to 7 days depending on the control of inflammation and IOP. On the day of surgery 20% I.V. mannitol 5ml/kg was given and the pupil was dilated with a combination of 1% tropicamide and 5% phenylepinephrine. 1% flurbiprofen eye drops to prevent intraoperative miosis and 0.3% ciprofloxacin eye drops as a prophylactic antibiotic were instilled 4 times, one hour before surgery.

Small incision extra capsular cataract extraction was done with a superior fornix-based conjunctival flap and a mid limbal (Corneoscleral) section. 2% methylcellulose viscoelastic was used to deepen the anterior chamber. Can-opener capsulotomy was done using a bent tip of a 26-gauge needle. After enlarging the corneoscleral section, manual removal of the nucleus was done. The remaining cortical matter was aspirated with a Simcoe bi-way cannula to avoid postoperative uveal reaction. An appropriately powered posterior chamber intraocular lens (PC IOL) was implanted. At the end of surgery, a sub-Tenon injection of dexamethasone (2mg) and gentamicin (20mg) was given in the lower fornix.

Subsequently, the patients were kept in the hospital for a postoperative period of 3-5 days. A combination of ciprofloxacin and dexamethasone eye drops 6 times a day and 2% homatropine eye drops, ciprofloxacin 500mg tab 2 times a day, acetazolamide 250mg tab three times a day, ibuprofen 400mg tab three times a day and B complex vitamins were given for the first 5 to 7 postoperative days. Systemic steroids were not used in any patient. They were discharged with instructions to use a topical dexamethasone eye drops tapered gradually over the next 6-8 weeks. and to attend a postoperative follow-up examinations at 2, 4 and 6-8 weeks. During the follow up at each visit, examination with slit lamp biomicroscopy, best corrected Snellen's visual acuity, IOP by Goldmann's Applanation tonometry and optic disc evaluation with indirect ophthalmoscopy and +90 D lens were done. In eyes in which gonioscopy could not be done preoperatively, the assessment was done at 6-8 weeks. postoperatively. The results were evaluated at completion of 6-8 weeks. in relation to visual outcome, IOP control and postoperative complications if any.

RESULTS

The study group was 30 eyes of patients clinically diagnosed as phacolytic glaucoma.

Table 1: Age and sex distribution.

Age in years	Male	Female	Total	%
>50-60	14	5	19	63.3
>60-70	5	4	9	30.0
>70	2	0	2	6.4
Total	21	9	30	100.0
%	70.0	30.0		
Mean age	59.95	62.6	60.7	

Age group distribution was 19(63.3%) in >50-60 yrs, 9(30.0%) in >60-70 yrs and 2(6.4%) in >70 yrs. Sex distribution was 21 (70.0%) of males and 9 (30.0%) of females. Mean age of the all the patients was 60.7 yrs, of males 59.95 and of females 62.6.

Table 2: Laterality distribution.

Laterality	Males	Females	Total	%
RE	11	5	16	53.4
LE	5	4	14	46.6
Total	16	9	30	100.0
%	70.9	30.0		

Laterality was RE in 16 (70.9%) and LE in 9 (30.0%).

Table 3: Duration of the presenting symptoms at the time of reporting to the hospital.

Duration			No.	%	Total	%
<1week	<48 hours		1	1.34	17	56.6
	>48 hours-<1 week	2-5 days- 9 5-7 days- 7	16	53.3		
>1week	>1-2 weeks	7-10 days- 5 10-15 days- 6	11	36.6	13	43.3
	>2 weeks	2	2	6.6		
Total			30	100.0	30	
Mean	9 days					

Table 4: Intraocular pressure (IOP) in mmHg.

Range	Pre-operative	
	No.	%
<30	0	0.0
30 -35	8	26.7
>35- 40	6	20.0
>40-50	8	26.7
>50- 60	2	6.6
>60-70	6	20.0
Total	30	100.0
Mean IOP	45.8	

Duration of the presenting symptoms before reporting of the patients to the hospital was <48 hrs in 1 (1.34%), >48 hrs- <1 week. in 16 (56.6%), >1-2 weeks in 11 (36.6% and >2 weeks in 2 (6.6%). i.e. <1 week were 17 (56.6% and >1 week in 13 (43.3%) (Table 3). Preoperatively IOP in mmHg was 30-35 in 8 (26.6%), >35-40 in 6 (20.0%), >40-50 in 8 (26.6%), >50-60 in 2 (6.6%) and >60-70 in 6 (20.0%). Mean IOP was 45.8 mmHg pre-operatively (Table 4). Visual acuity preoperatively was PL doubtful in 2 (6.6%), PL +ve in 15 (50.0%) and HM- <3/60 in 13 (43.4%). Postoperatively at 6-8 weeks was 6/6-6/18 in 3 (3.4%), <6/18-6/60 in 21 (70.0 %), <6/60-3/60 in 3 (10.0%) and <3/60 -HM in 5 (16.6%).

Table 5: Visual acuity (VA).

Snellen's VA		Preoperative				Postoperative at 6-8 weeks			
		No.	%	Total	%	No.	%	Total	%
<6/60	PL doubtful	2	6.6	30	100.0			8	26.7
	PL +ve	15	50.0						
	HM- <3/60	13	43.4			5	16.6		
	3/60- <6/60					3	10.0		
>6/60	6/60- <6/18					21	70.0	22	73.3
	6/18-6/6	0	0.0			1	3.4		

So, postoperative visual acuity was <6/60 in 8 (26.7%) and >6/60 in 22 (73.3%).

Table 6: Post-operative complications.

Complications	No.	%
Bullous keratopathy	5	16.6
Anterior uveitis (with membrane on IOL)	7	23.3
Posterior capsular tear	3	10.0
Zonular dialysis	2	6.6

Postoperative complications were bullous keratopathy in 5 (16.6%), anterior uveitis with membrane on IOL in 7 (23.3%), posterior capsular tear in 3 (10.0%) and zonular dialysis in 2 (6.6%).

Table 7: Status of the fellow eye.

Status of the fellow eye	No.	%
Pseudophakia	22	73.4
Immature cataract	6	20.0
Aphakia	2	6.6

Examination of the fellow eye showed pseudophakia in 22(73.4%), immature cataract in 6 (20.0%) and aphakia in 2 (6.6%).

DISCUSSION

Lens induced glaucomas are a common occurrence in India. Phacolytic glaucoma is usually associated with a hypermature cortical cataract. Increasing backlog of cataract cases, due to the population explosion with an increased life expectancy, an expanding aging population and suboptimal utilization of the available cataract surgical services by the rural community lead to an increase in phacolytic glaucoma especially in areas with a poor access to medical care.

Phacolytic glaucoma is characterized by sudden rise in IOP. It is clinically diagnosed by the presence of corneal oedema, aqueous flare with cells, and a normal or deep anterior chamber with floating lens particles in the presence of a white hypermature morgagnian cataractous lens. The pathogenetic mechanism is an inflammatory response due to the micro leakage of high molecular weight lens proteins through an intact anterior lens capsule leading to obstruction of the trabecular meshwork by lens proteins, protein-laden macrophages, and inflammatory debris and was shown to be reversible by lens extraction alone.[6,10,11,20,21] This study of phacolytic glaucoma was to determine the postoperative visual outcome following a planned small incision extracapsular cataract extraction with PC IOL after the control of raised IOP and inflammation.

All the 30 patients were managed by small incision extracapsular cataract extraction after the control of preoperative IOP and inflammation. The surgical technique by itself was not different from a routine extracapsular cataract extraction. IOP showed a dramatic decline in all cases after surgery and stabilised by the 1st wk. with a postoperative IOP of <20 mmHg without any additional antiglaucoma drugs. The uveal reaction was relatively more during the first postoperative week compared to normal eyes and was cleared completely within 2 weeks in all the cases.

Apart from the demographic factors such as age and sex of the patient and socioeconomic status, duration of the symptoms and preoperative and postoperative IOP and visual acuity were analyzed.

The mean age in years at presentation was 60.7 similar to Prajna et al of 63.[22] The mean age in years of the males 59.95 and the females 62.6 was similar to Prajna et al of males 64 to females 61.[22] Phacolytic glaucoma occur commonly with increasing age, probably due to the aggregation of high molecular weight proteins over time, and primary open angle glaucoma is more common in old age, probably due to the susceptibility of the optic nerve to damage.[23-26] There were70.0% Males to 30.0% Females, unlike in Prajna et al of males (46%) to the females (54%).[22]

This study may not reflect the true distribution of phacolytic glaucoma in the general population, as all the patients were from the lower socio-economic group and may differ from the higher socio-economic group. All patients presented with symptoms of slowly progressive decreased vision, followed by an acute onset of redness, pain, and watering in the affected eye with the mean duration of symptoms of 9 days similar to Prajna et al of 6 days and Briganza et al of 11.5 days.[22,27]

The mean IOP in mmHg preoperatively was 45.8 similar to Prajna et al of 40.0 and Briganza et al of 42.5 and was controlled to ≤21 mmHg similar to the studies of Prajna et al and Briganza et al.[22,27]

The postoperative visual acuity at 6-8 weeks. was 6/6-6/18 in 3.4 %, <6/18-6/60 in 70.0%, <6/60-3/60 in 10.0% and <3/60 -HM in 16.6% compared to Prajna et al of 6/12 or better in 61.0%, <6/60 in 13.6% and in Briganza et al of 6/24 or better in 85.4%, 6/18 in 11.0%, 6/36 in1.5% and PL +ve in 2.3%.[22,27] The postoperative visual acuity of 6/12 or better was 70.0%, similar to Prajna et al of 61.0% and Singh et al of 80.0%.[22,28]

Postoperative complication of uveitis seen in more than 50% of eyes was easily controlled with topical and systemic corticosteroids similar to 82.0% in Prajna et al and 65.2% in A Briganza et al.[22,27] Examination of the fellow eye showed pseudophakia 73.4%, immature cataract 20.0% and aphakia 6.6% not comparable with Prajna et al of aphakia (72.0%) and immature cataracts (27.0%) and in Briganza et al of aphakia (56.5%) and phakic in 43.5%.[22,27]

CONCLUSION

Our study of phacolytic glaucoma concludes that small incision extracapsular cataract surgery with PC IOL implantation with controlled preoperative IOP and inflammation is an effective method in the management of phacolytic glaucoma with a good postoperative visual outcome.

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